SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, March 4.—"Experiments on the Absence of Mechanical Connection between Ether and Matter." By Oliver Lodge, D.Sc., F.R.S., Professor of Physics, University College, Liverpool. Received January 19.

The author gives an abbreviated account of a long series of experiments conducted by himself and his assistant, Mr. Davies, in continuation of those related in *Phil. Trans.*, 1893 (Aberration Problems, &c.). The method consists in bifurcating a beam of light, and sending each half in opposite directions round a closed periphery very near a rapidly rotating mass of matter, and then observing by means of interference fringes whether the velocity of light is affected in the slightest degree by this neighbourhood of moving matter. The steel disks have been now whirled to higher speeds, chiefly at 3000 revolutions a minute; the steadiness of the machine and the definition of the bands have been improved, other minor improvements have been made, and a long series of micrometric readings have been taken, both at increasing and at decreasing speeds.

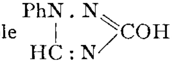
Further, the steel disks have been replaced by a much more massive lump of iron, weighing $\frac{3}{4}$ ton, with a narrower channel for the light to travel in; and the bands have been observed close up to the moving surface, and even when reflected in it. The rotation was also continued for some hours to see if by chance *time* had any influence.

Moreover, the iron mass was strongly magnetised by a steady current, so that the light travelled across a moving magnetic field; and lastly the steel disks were replaced, with an insulated third disk between them, and strongly electrified, so that the beam of light travelled across a moving electrostatic field. After a number of spurious disturbances had been gradually eliminated, the author finds that in none of these ways is the velocity of light at all appreciably affected, and accordingly concludes that there is no viscous connection between the ether and matter of observable magnitude; *i.e.* that whatever motion moving matter may confer upon the ether must be of an irrotational kind. It was demonstrated theoretically in the previous memoir that no optical experiments could be competent to detect motion of this latter character, and accordingly no attempt has been made to look for any kind of motion except such as would be caused by something akin to viscosity.

Incidentally the author points out that by rotating the whole optical apparatus and observer, instead of the disks, at a very moderate speed, a shift of the bands should be seen; and even that the earth's rotation would with a large enough frame produce an effect, which latter, however, it appears difficult or impossible to observe, not on account of its smallness, but on account of its constancy.

The effect to be expected on Fresnel-Fizeau principles from whirling *air*, was unfortunately just too small for the author to safely observe. The residual disturbing causes just masked it, but it is probably not beyond the reach of another attempt with a still more thoroughly steady machine, if any one feels inclined to persevere so far. At the same time if it be supposed that any microscopic trace of true ether effect still possibly exists (which the author wholly disbelieves), and if a further attempt be hereafter made to observe it, a number of slight residual disturbing causes would be got rid of (and probably other difficulties introduced), by rotating the machine in a vacuum.

Physical Society, March 12.—Mr. Shelford Bidwell, President, in the chair.—Mr. William Barlow read a paper on a mechanical cause of homogeneity of structure and symmetry, geometrically investigated, with special application to crystals and to chemical combination, illustrated by models. The author has previously established that every homogeneous structure displays one or other of the thirty-two kinds of crystalline symmetry. He now shows that homogeneous structures possessing most, if not all, of these kinds of symmetry may be produced mechanically, as the equilibrium arrangements of assemblages of mutually-repellent particles; and also that these mechanical systems of particles exhibit characteristics entirely analogous to certain crystalline and other properties of matter. The fundamental concept may be summarised thus: A number of different kinds of mutually-repellent particles dispersed through space; the amount of this repulsion being some inverse function of the distance between the particles concerned; the particles are destitute of polarity, and the difference in kind consists in a difference in the degree of mutual repulsion which two particles exercise, according to the kinds taken. It is further premised that the assemblage is agitated so as to render unstable all but the final equilibrium arrangement, and a means is provided for linking the particles symmetrically, and unlinking them, under certain circumstances, so as to modify the repulsion between the particles affected. The data thus summarised may be regarded as merely provisional, because the making of the equilibrium arrangement one in which "closest packing" prevails is the object primarily aimed at; and these concepts are mere devices for attaining this end. By the employment of particles of different kinds, a large amount of variety is provided for. The first step taken is to deduce the law of "closest packing," which runs thus: Every assemblage of mutually-repellent particles will continually approximate to, or strive after, that relative arrangement of the particles composing it, in which it has come, at every part, to occupy a minimum of space under a given general pressure, or average repulsion, between the particles. This law acts on all assemblages, of the nature defined, however numerous the kinds of particles composing them; but, for its effects to be traceable, a very limited number of kinds must be present. Passing from assemblages consisting of a single kind of particle, the author takes a very simple case of two kinds of particles confined to a plane, and shows what type of symmetry will be produced when equilibrium is realised. Very simple cases of particles in space are then taken, and it is shown that a large number of different kinds of symmetry are displayed by the equilibrium arrangements produced when there is variety in the relations between the repulsions. To illustrate "close packing," stacks of balls of various sizes are employed; but it is pointed out that the conditions of statical equilibrium of the particles are not always adequately expressed in this way, although every case of the latter kind can be represented approximately by a case of the former kind, possessed of the same order of symmetry. Very slight variation in the relations between the repulsions, alters the form of the equilibrium arrangement; sometimes merely changing the angle without affecting the type; sometimes, when it passes some critical point, bringing about an alteration in type. Changes of the first kind resemble the change in crystal form caused by variation of temperature, whilst those of the latter kind, especially when associated with rearrangement of the particles, are analogous to polymorphism. In many cases, the arrangement of the particles is such that some may be removed without affecting the distribution of the remainder, and without disturbing the "close packing"; if, therefore, other particles, exercising a slightly less repulsion, be substituted for the removed, *inoperative*, particles, the only resulting change consists in a diminution of the pressure on the particles surrounding them. A species of isomorphism is in this way realised. When the particles of an assemblage are partially connected by hypothetic linking in a symmetrical manner, similar groups are formed; but, in order that the formation of such groups may not be arbitrary, the partitioning which is produced must have as complete symmetry as that of the partitioned structure. In consequence of this, some kinds of groups are not directly obtainable by symmetrical partitioning of a homogeneous structure; but it is always conceivable that they may be included in the larger groups of some more complex constellation, and that they may be subsequently separated to form an assemblage by themselves. Consequently, very intricate results may be reached by successive steps; symmetrical intermixture, linking, and unlinking, succeeding one another until complicated groups are built up, for the production of which such an agency as "close packing" appears at first sight inadequate. Having called attention to a large number of arrangements, some capable and some incapable of symmetrical partitioning into groups of a single kind, some linked and some unlinked, the author contends to have established the following two propositions: (1) The nature of the symmetry displayed by a homogeneous assemblage of mutually-repellent particles of different kinds, in equilibrium, depends on the relations subsisting between the repulsions exercised by these particles. (2) The assemblages belonging to all of the thirty-two classes of crystalline symmetry, result from the fundamental law of "close packing," when the relations between the different repulsions take the widest possible range of variety. Links which restrain the action of the repulsions can be present between some of the particles in some cases. The author refers to crystal "twinning," and points out that the action of dimorphism is competent to produce analogous "twinning" of symmetrical assemblages of linked particles. A number of other properties of linked assemblages analogous to those of crystals are also described. In the domain of chemistry the author cites the continually accumulating experimental evidence of the existence of geometrical arrangement in the molecule, both that established stereochemically and that derived from the study of isomerism, as revealing a state of things precisely such as is arrived at by the law of "closest packing" in assemblages afterwards broken up into similar groups of particles. Attention is called to many groupings of the latter order fulfilling very exactly the conditions of disubstitution in the case of many carbon compounds. While he does not regard his work as throwing any light on the nature of change of state, or change of bulk, the author observes that the distribution in precise proportions of the constituents, which must obviously accompany or precede a chemical combination, may fairly be claimed as a resemblance to the regular intermixture brought about according to the law of "closest packing." He further suggests that the reason why some bodies do not readily interact may be due to the "close packing" of one or both. Prof. Herschel said he was particularly pleased with the models. He thought it probable that a very wide application would be found for the author's results. There was, no doubt, much to be learnt from models built up of spheres of two or more sizes, but it would be necessary to learn a great deal more about these symmetrical arrangements before they could be applied with any degree of certainty. Mr. Fletcher said it was impossible to criticise the paper without long and careful study. From certain hypotheses the author had deduced a law of "closest packing" that seemed adequate to explain many results observed by chemists and crystallographers; at the same time admitting that the law might be presumed from other reasoning. By his models he had tried to present a picture not of the forms of atoms or molecules, but merely analytical representations of the probable structure of particles. Hitherto, the research had been confined to determining the possible arrangements of particles all of one kind, but here were examples of packed spheres of various sizes. It was not quite clear how, in an elementary substance, there could be such a structure, although there certainly were cases of polymorphism awaiting explanation, as for instance with sulphur. The paper with its 188 pages of MS. represented a vast amount of clear thinking, and many years of admirable work. Prof. Adams called the attention of Fellows of the Physical Society to the museum at King's College, where were the original models as made and used by the early investigators of this branch of physics. Prof. Miers (communicated, too late for reading). The principle of "close packing" was not new, but Mr. Barlow was the first to extend it to explain solution, diffusion, and stereochemical problems. His remarks on the growth of curved crystals, vicinal faces, and pseudo-symmetrical crystals, were open to criticism. With regard to vicinal faces, however, lencite seemed to be a mineral in accord with his hypothesis. The author regarded a crystal as consisting of mutually repellent particles of different sorts; this seemed a very right way of attacking the problem of crystal structure, and would explain some recent observations of Rinne on crystals consisting of water particles and silicate particles. Further, Mr. Barlow had considered the way in which an assemblage might be broken up by the loosening of the ties, and the change of partners, among individual members. That is to say, he had considered crystallisation and solution; features quite ignored by ordinary theories. His view of crystal structure failed to explain why crystals should have faces, and gave no hint as to the controlling forces which keep mutually-repellent particles together. Nevertheless it suggested, among other striking analogies, those bearing on the relationship between crystal structure and chemical constitution; and the irregularities of crystals, such as were commonly neglected in accepted theories. Mr. Barlow had opened up a very promising line of inquiry. Mr. Barlow, in replying, said he greatly appreciated the interest shown in his work.—The President then proposed a vote of thanks to the author, and the meeting was adjourned until March 26. At the invitation of Dr. S. P. Thompson, the Society will on that occasion meet at the Technical College, Leonard-street, Finsbury.

Chemical Society, February 18.—Mr. A. G. Vernon Harcourt, President, in the chair.—The Longstaff medal of the Society was awarded to Prof. Ramsay.—The following papers were read:—The formation of dithionic acid in the oxidation of sulphurous acid by potassium permanganate, by T. S. Dymond nd F. Hughes. In oxidising sulphurous acid by potassium permanganate the authors find that, in addition to sulphuric acid, a constant proportion of dithionic acid is produced; an explanation of this fact is suggested.—On the production of pyridine derivatives from ethylic β-amidocrotonate, by J. N. Collie. Ethylic β-amidocrotonate hydrochloride condenses on heating to give the ether of an oxylutidine $C_{10}H_{13}NO_3$; an isomeric ether is obtained on heating a mixture of the amidocrotonate and its hydrochloride. The corresponding acids decompose on heating, yielding pseudolutidostyril.—Sodamide and some of its substitution derivatives, by A. W. Titherley. Sodamide yields substitution derivatives with amines or amides of the composition NaNHR or NaNH.CO.R respectively.—Rubidamide, by A. W. Titherley. Rubidamide, or $RbNH_2$, is obtained by heating rubidium in ammonia; it is crystalline, melts at 285–287°, and is decomposed by water or alcohol.—On the spectrographic analysis of some commercial samples of metals, of chemical preparations, and of minerals from Stassfurt potash beds, by W. N. Hartley and H. Ramage. The spectroscopic examination of a large number of materials has enabled the authors, in continuation of their previous work, again to demonstrate the wide distribution of many of the rare metals.—Dissociation pressure of alkylammonium hydrosulphides, by J. Walker and J. S. Lumsden.—Supposed condensation of benzil with ethyl alcohol. A correction, by F. R. Japp.—The viscosity of mixtures of miscible liquids, by T. E. Thorpe and J. W. Rodger. The authors contribute the results of measurements made on mixtures of carbon tetrachloride and benzene, methyl iodide and carbon bisulphide, and of ether and chloroform. The densities of the mixtures cannot be calculated by the ordinary admixture rule, whilst the viscosity is rarely a linear function of the composition.—Magnesium nitride as a reagent, by H. L. Snape. The author has investigated the action of magnesium nitride on chloroform, perchlorethane and benzaldehyde, in the hope of obtaining hydrogen cyanide, cyanogen and $(C_6H_5.CH)_3N_2$ respectively; the experiments, however, were unsuccessful.—The identity of Laurent's amarone with tetraphenylazine, by H. L. Snape and A. Brooke. Tetraphenylazine is obtained by the action of magnesium nitride on benzaldehyde; it is identical with Laurent's amarone.—Studies on the interaction of highly purified gases in presence of catalytic agents, by W. French. In absence of light spongy platinum does not induce combination in a mixture of dry hydrogen and oxygen.—Contributions to the knowledge of the β-ketonic acids. Part iii., by S. Ruhemann.—Contributions to the knowledge of the β-ketonic acids. Part iv., by S. Ruhemann and A. S. Hemmy.—Oxidation of phenylstyrenyloxytriazole, by G. Young. Phenylstyrenyloxytriazole is oxidised by permanganate to phenyloxytriazolecarboxylic acid, which immediately decomposes, yielding phenyloxytriazole  $\begin{array}{l}PhN\,.\,N\\ \;\;|\quad\quad\;\;\rangle COH\\ HC:N\end{array}$.—Apiin and apigenin (preliminary notice), by A. G. Perkin. Apigenin $C_{15}H_{10}O_5$, the product of hydrolysis of apiin, the glucoside of parsley, contains no methoxy-groups, and yields a tribenzoyl-compound.—Note on the constitution of the so-called "nitrogen iodide," by J. W. Mallet.

Geological Society, February 24.—Dr. Henry Hicks, F.R.S., President, in the chair.—On the nature and origin of the Rauenthal serpentine, by Miss Catherine A. Raisin. This serpentine has been already described by Herr Weigand as one of those which occur in regions of gneiss or schist related in their origin to these rocks. In order to test this hypothesis as to the formation of the serpentine, the author examined the district and studied its rocks with the microscope. Herr Weigand asserted that transitions could be recognised from typical gneiss to a peculiar amphibolite, and that the latter rock had been changed to serpentine. The author could find in the field no evidence of a passage from gneiss to amphibolite, and called attention to the general difficulty of the supposition.—On two boulders of granite from the middle chalk of Betchworth (Surrey), by W. P. D. Stebbing. The author noticed cases of occurrence of boulders in chalk which have been previously described; and recorded the occurrence of two boulders which were obtained from the chalk of the *Terebratulina-gracilis* zone. The largest weighed 7 lb. 7 oz., measured 5″·8 × 6″·25 × 4″·125, and consisted of decomposed granite; valves of *Spondylus latus* and *Serpula* were still attached. The other, also granite, though of a different character, weighed 3 lb. 12 oz., and measured 3″·6 × 5″·8 × 4″·5. Prof. Bonney furnished a description of the microscopic characters of the two boulders, which are possibly of Scandinavian origin. The author discussed the mode of transport to their present position, and favoured the agency of floating ice.—Coal: a new explanation of its formation; or the phenomena of a new fossil plant considered with reference to the origin, composition, and formation of coal-beds, by W. S. Gresley. The author argued that the brilliant black laminæ in coal and similar materials to those that form these laminæ, which are found in earthy coals, shales, and clays, point to the former existence of an aquatic plant, having the general shape of the modern *Platycerium alcicorne*, which grow *in situ*. He believed that much coal was formed by this aquatic "coal-plant," which grew amongst the mechanical sediments and the débris of the terrestrial vegetation that accumulated on the floors of sheets of water.

Zoological Society, March 2.—Dr. W. T. Blanford, F.R.S., in the chair.—The Secretary exhibited two specimens of a new viper, recently discovered by Captain A. H. McMahon during the recent survey of the Indo-Persian frontier, and named *Eristicophis macmahoni* (gen. et sp. nov.) by Dr. Alcock. This snake had been met with only in the sandy portions of the desert between Mushki and Persia, where it was almost impossible to detect its presence, owing to its habit of lying buried in the sand with only its head visible.—Mr. Gambier Bolton gave an account (illustrated by photographs shown by the oxy-hydrogen light) of a recent visit that he had made to the Bird Islands in Saldanha Bay, South Africa. The photographs illustrated the life of the black-footed penguin (*Spheniscus demersus*) on these islands, showing these birds in groups, nest-building, sitting on their eggs, and moulting. Mr. Bolton also gave an account of the guano- and egg-industry carried on by the Cape Government in the Bird Islands and other adjacent islands.—Mr. W. B. Tegetmeier exhibited and made remarks upon a specimen of a starling (*Sturnus vulgaris*) with enormously elongated mandibles.—Mr. H. M. Wallis read a paper entitled "The Growth of Hair upon the Human Ear, and its testimony to the Shape, Size, and Position of the Ancestral Organ."

Entomological Society, March 3.—Mr. R. Trimen, F.R.S., President, in the chair,—Mr. George W. Bird, Mr. Alfred H. Martineau, Mr. Hubert C. Phillips, Mr. William A. Vice, and Mr. Colbran J. Wainwright were elected Fellows of the Society.—Mr. Champion exhibited, on behalf of Messrs. Godman and Salvin, a portion of the Elateridæ, and the Cebrionidæ and Rhipidoceridæ recently worked out by him in the "Biologia Centrali-Americana." The Elateridæ included 531, the Cebrionidæ 29, and the Rhipidoceridæ 14 species, a large proportion of which were described as new. He called attention to the excessive rarity of the males in the Elaterid genera *Chalcolepidius* and *Semiotus* (the contrary being the case in the genus *Scaptolenus* of the Cebrionidæ, and also in many Elateridæ). One species, *Meristhus scobinula*, Cand., was common to Central America and China.—Mr. Jacoby showed a Halticid beetle, taken in Mashonaland by Mr. G. A. K. Marshall, and remarkable for a prolongation of the hind tibia beyond the tarsal articulation into a very long serrated process.—Mr. Elwes showed a series of Papilionidæ of the *Machaon* group, from North America, including *P. machaon* and *P. oregonia* from British Columbia, *P. brucei*, *P. bairdii*, and *P. zolicaon* from Glenwood Springs, Colorado, and the latter species from British Columbia. He stated that there was a tolerably complete gradation from *P. oregonia* (= *machaon*) through *P. brucei* to *P. zolicaon*, that none of the characters which had been relied on for separation were of real value, and that the structure of the genitalia afforded no assistance.—Mr. O. H. Latter read a paper on "The prothoracic gland of *Dicranura vinula*, and other notes," in continuation of his previous communications on the subject. A fresh use of the formic acid secreted by the larva was described; it was employed to alter the silk secreted in spinning the cocoon, in order to convert it into the well-known horny mass. If the acid was prevented from acting, as by supplying the larvæ with bits of blotting-paper soaked in an alkali to be utilised in making the cocoon, the silk thus protected from the action of the acid retained its usual fibrous structure.—Sir George Hampson communicated a paper on "The Classification of two subfamilies of Moths of the Family Pyralidæ—the *Hydrocampinæ* and *Scopariancæ*."

CAMBRIDGE.

Philosophical Society, February 22.—Mr. F. Darwin, President, in the chair.—On the diffraction pattern near the focus of a telescope, by Mr. R. H. D. Mayall. The diffraction pattern dealt with in this paper is supposed to be formed by the light from a star, upon a screen placed near the focus of a telescope. Series have been given by Lommel for the calculation of the intensity of illumination at any point of the pattern, but these become useless when the screen is more than a millimetre distant from the focus of a telescope of ordinary aperture. The series may, however, be transformed into a shape from which approximate values of the intensity may be found. This is shown in the present paper. It appears from the results that the pattern consists of a bright and comparatively broad ring surrounding a series of fainter and narrower rings, these latter fading away rapidly into a uniformly illuminated space. Further inwards towards the centre the uniform illumination disappears and another series of rings is formed.—On the marks made by stars on photographic plates exposed near the focus of a telescope, by Mr. H. F. Newall. In this paper an account is given of some of the appearances presented by photographs of star images taken near the focus of a telescope, with special reference to the concentration of light near the boundaries of the images when the aperture of the telescope is partly obstructed. The observations recorded are in the main supplementary to those which were published in the *Monthly Notices* of the Royal Astronomical Society in 1894 and suggested the theoretical investigation undertaken by Mr. Mayall.—Theorems on the contacts of spheres, by Mr. W. McF. Orr.—Change of the independent variable in a differential coefficient, by Mr. E. G. Gallop.—On a method of Lie for solving partial differential equations, by Dr. A. C. Dixon.

PARIS.

Academy of Sciences, March 8.—M. A. Chatin in the chair.—Researches on the earths contained in the monazite sands, by MM. Schutzenberger and Boudouard.—The sulphate of cerium obtained from monazite sand gave numbers on analysis indicating an atomic weight sensibly higher than the cerium sulphate obtained from cerite. It was found possible to break up the former into three fractions, one not precipitated from solution by cupric oxide, with an atomic weight of 138, another precipitated from the solution of its sulphate by both cupric oxide and by sodium sulphate (atomic weight about 148), and the third precipitated by cupric oxide, but not by sodium sulphate (atomic weight about 157).—On the apparatus employed to collect samples of air at a great height, in the ascent of the *Aérophile* on February 18, 1897. Analysis of the air collected, by M. L. Cailletet. The vacuous reservoir was fitted with a special tap, worked by a clock, so arranged as to open at one hour and a quarter after commencing the ascent, previous experiments having shown that this corresponded with the maximum height. The results of the analysis showed that the composition of the air at these high altitudes (51,000 feet) is practically the same as on the ground. Observations on the subject of the preceding communication, by M. A. Müntz. The slight diminution in the oxygen found, and the slight increase in the carbonic acid, may possibly be due to a slight oxidation of the grease used to lubricate the tap.—M. G. Bonnier was elected a member in the Section of Botany, in the place of the late M. Trécul.—On the reduction of the general problem of integration, by M. Riquier.—Theorem on entire series, by M. Hadamard.—On the centres of gravity of surfaces parallel to a closed surface, by M. Ernest Duporcq.—On permanent deformation of glass, and displacements of the zero of thermometers, by M. L. Marchis. Experiments are cited showing that alternate heating and cooling of a thermometer is more efficacious in displacing the zero of a thermometer than long heating at a fixed temperature.—Application of the Röntgen rays to measure the electromotive force of contact, by M. Jean Perrin.—The action of phosphorus upon gold, by M. A. Granger. At a temperature of about 400° C. phosphorus vapour combines with gold, forming a phosphide, Au_3P_4. To isolate this it is necessary to cool the tube rapidly, as the temperature limits between which the compound is stable are very narrow.—On the estimation of antimony in the state of peroxide, by M. H. Baubigny. Sb_2O_5 is fairly stable at 357°, begins to lose oxygen at 440°, and leaves a constant residue of Sb_2O_4 at 800°, the purity of which was tested by dissolving in hydrochloric acid in presence of potassium iodide, and weighing the antimony as the trisulphide.—Action of free bases on salts, by M. Albert Colson. From an experimental study of the replacement of diisobutylamine and piperidine by ammonia, it is concluded that the decomposition of ammoniacal salts by fixed bases is a phenomenon of heterogeneous dissociation.—On a new derivative of phenylisindazol, obtained by the action of salicylic aldehyde upon phenylhydrazine, by M. H. Causse.—Action of tannin upon some alkaloids, by M. Oechsner de Coninck. Pyridine and piperidine can be readily distinguished by their reactions with an aqueous solution of tannin.—On the use of cryoscopic methods in the analysis of milk, by MM. Bordas and Génin. This is a reply to a note on the same subject, by M. Winter. The results obtained, although fairly constant, are opposed to the exclusive use of the freezing-point method for milk; its only value is as a method of control.—On the carbohydrates remaining in beer, by M. P. Petit.—On oxidation and the decolourisation of wines, by M. V. Martinand. This oxidation can take place sometimes in the absence of an oxydase, if the wine is acid.—Mineralogical study of the action of volcanic sulphuretted fumerolles upon serpentine, by M. A. Lacroix. The minerals observed include epsomite, marcasite, melanterite, and copiapite, all directly attributable to the action of the sulphuric acid and hydrogen sulphide upon the serpentine.—The geological constitution of the mountains about the sources of the Bléone and the Var, by M. Kilian.—Parallelism between the cretaceous beds of Mondégo and Lisbon, by M. Paul Choffat.—Note on the treatment of articular diseases by electricity, by M. Danion.—Note on the numerical relations between the masses of the planets, by M. Delauney.

DIARY OF SOCIETIES.

THURSDAY, March 18.

Royal Society, at 4.30.—Cultural Evolution of the Cyclamen: W. T. Thiselton-Dyer.—On the Conditions which render Absolute the Readings of the Mercurial Thermometer: S. A. Sworn.—Experiments on the Flame Spectrum of Carbon Monoxide: Prof. Hartley, F.R.S.

Royal Institution, at 3.—Greek History and Extant Monuments: Prof. Percy Gardner.

Linnean Society, at 8.—Further Observations on Stipules: Right Hon. Sir John Lubbock, Bart., M.P., F.R.S.—On the Origin of Transfusion-tissue in the Leaves of Gymnospermous Plants: W. C. Worsdell.

Chemical Society, at 8.—On the Atomic Weight of Carbon: Dr. Alexander Scott.—On a New Series of Mixed Sulphates of the Vitriol Group: Dr. Alexander Scott.—The Action of Alkylhaloids on Aldoximes and Ketoximes: Wyndham R. Dunstan, F.R.S., and Ernest Goulding.

Institution of Civil Engineers, at 8.—The Fifth "James Forrest" Lecture—Bacteriology: Dr. G. Sims Woodhead.

Sanitary Institute, at 8.—Infectious Diseases and Methods of Disinfection: Dr. H. R. Kenwood.

Camera Club, at 8.15.—Geographical Pictures: Dr. H. R. Mill.

FRIDAY, March 19.

Royal Institution, at 9.—Greek and Latin Palæography: Sir Edward Maunde Thompson.

Epidemiological Society, at 8.—The Prevention of Tuberculosis: Dr. James Niven.

SATURDAY, March 20.

Royal Institution, at 3.—Electricity and Electrical Vibrations: Lord Rayleigh, F.R.S.

MONDAY, March 22.

Imperial Institute, at 8.30.—The Timber Supply of the British Empire: Dr. W. Schlich.

Society of Arts, at 4.30.—Alloys: Prof. W. Chandler Roberts-Austen, C.B., F.R.S.

Royal Geographical Society, at 8.30.—The North Polar Problem: The President.

Sanitary Institute, at 8.—Water Supply, Drinking Water, Pollution of Water: Prof. W. H. Corfield.

Camera Club, at 8.15.—A Run through Portugal and Madeira, to the Great River Amazon: W. Wethered.

TUESDAY, March 23.

Royal Institution, at 3.—Animal Electricity: Prof. A. D. Waller, F.R.S.

Royal Horticultural Society, at 1.—Fruit-bud Transference.

Institution of Civil Engineers, at 8.—Paper to be discussed: The Mond Gas-Producer Plant and its Application: H. A. Humphrey.

Royal Photographic Society, at 8.—Polar Exploration: A. Montefiore Brice.

Royal Victoria Hall, at 8.30.—Marine Food Fishes: Gilbert C. Bourne.

WEDNESDAY, March 24.

Society of Arts, at 8.—The Transmission of Power by Alternating Electric Currents: W. B. Esson.

Geological Society, at 8.

Institution of Civil Engineers, at 4.—Dr. G. Sims Woodhead will repeat the Fifth "James Forrest" Lecture on Bacteriology.

THURSDAY, March 25.

Royal Society, at 4.30.—Meeting for Discussion. *Subject*: The Chemical Constitution of the Stars, introduced by J. Norman Lockyer, C.B., F.R.S., with a Communication "On the Chemistry of the Hottest Stars."

Royal Institution, at 3.—The Relation of Geology to History: Prof. W. Boyd Dawkins, F.R.S.

Society of Arts (Imperial Institute), at 8.—The Cultivation and Manufacture of Rhea Fibre: Thomas Barraclough.

Institution of Electrical Engineers, at 8.—On some Repairs to the South American Company's Cable off Cape Verde, 1893 and 1895: H. Benest. (Continuation of Discussion.)

Chemical Society, at 8.—The Pasteur Memorial Lecture: Prof. P. F. Frankland, F.R.S.

Camera Club, at 8.15.—From Mont Blanc to the Matterhorn: Lamond Howie.

FRIDAY, March 26.

Royal Institution, at 9.—Early Man in Scotland: Sir William Turner, F.R.S.

Physical Society, at 5.

Institution of Civil Engineers, at 8.—The Re-signalling of the Liverpool Street Terminus of the Great Eastern Railway: W. J. Griffiths.

SATURDAY, March 27.

Royal Institution, at 3.—Electricity and Electrical Vibrations: Lord Rayleigh, F.R.S.

Royal Botanic Society, at 4.

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

Books.—Bis an's Ende der Welt!: Dr. F. J. Studniěka, Zweite Ergänzte Auflage (Prag).—A Handbook for Travellers in Lower and Upper Egypt, 9th edition (Murray).—Results of Rain, River, and Evaporation Observations made in New South Wales during 1895: H. C. Russell (Sydney).—Through Unknown African Countries: Dr. A. Donaldson Smith (Arnold).—A Handbook to the Order Lepidoptera: W. F. Kirby. Vol. iv. Moths, Part 2 (Allen).—Annuaire de L'Observatoire Royal de Belgique, 1897 (Bruxelles).—Theory of Physics: Dr. J. S. Ames (New York, Harper).

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